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EXAMINER	
PATEL, DHARTI HARIDAS	
ART UNIT	**PAPER NUMBER**
2836	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/03/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/723,856	KNIGHT, LARRY KEITH	
	Examiner	Art Unit	
	Dharti H. Patel	2836	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 October 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-55* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *23-33* is/are allowed.

6)☒ Claim(s) *1-8,12-16,34-41 and 45-49* is/are rejected.

7)☒ Claim(s) *9-11,17-22,42-44 and 50-55* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of claims 1-55 in the reply filed on 10/10/2006 is acknowledged.

Claim Objections

2. Claims 1-2 are objected to because of the following informalities:

Claim 1, lines 3 and 5, claim 2, line 2, the words "the magnet" should read – the superconducting magnet –

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-2, 13-15, and 34-35 are rejected under 35 U.S.C. 102(b) as being anticipated by Blakeley et al., Patent No. 5,323,776.

With respect to claim 1, Blakeley teaches a method [Fig. 1] for automatically controlling ramp-up of a superconducting magnet [Fig. 1, 10], comprising connecting a power supply to the magnet [Fig. 1, 52, 54, Abstract, lines 3-6]; determining constraining parameters of the ramp-up [Col. 3, lines 52-58]; applying power to the magnet [Fig. 1, power coming from 52 via cable 56];

automatically controlling the ramp-up based on the constraining parameters [Fig. 1, Superconducting magnetic control 16, Col. 3, lines 61-64]; and continuing ramp-up until a predetermined value of a target parameter is reached [Col. 4, lines 1-4].

With respect to claim 2, Blakeley teaches that the method further comprises automatically controlling a rate of supply current to the magnet based on the constraining parameters [Col. 3, superconducting magnetic control circuit 16 controls the supply current to the superconducting magnet 10 based on the superconducting temperature of the magnet 10], and wherein the target parameter comprises magnet frequency or field strength [Col. 4, lines 1-2, magnetic field], and the constraining parameters include magnet current and magnet temperature [Col. 3, lines 52-68].

With respect to claim 13, Blakely teaches a method [Fig. 1] for automatically controlling a ramp-up of a superconducting magnet [Fig. 1, 10], comprising applying power to the magnet [Fig. 1, 52, 54, Abstract, lines 3-6] constrained by a target current ramp-up rate and magnet temperature during a first phase of ramp-up [Both of these parameters are measured by the superconducting magnetic control 16 in Fig. 1]; applying power to the magnet constrained by a target magnetic field strength [Col. 4, lines 1-4] or frequency and by magnet temperature during a second phase of ramp-up; and terminating application of power to the magnet upon reaching a target magnetic field strength or frequency [The superconducting magnetic control 16 terminates power to the

magnet upon reaching a target magnetic field strength, so it does not go beyond predetermined target magnetic field].

With respect to claim 14, Blakeley teaches that the method comprises measuring magnet temperature [Col. 3, lines 52-58], current applied to the magnet [Col. 3, lines 61-64], and magnetic field strength [Col. 4, lines 1-4] continuously during ramp-up.

With respect to claim 15, Blakely comprises automatically controlling ramp-up such that the magnet temperature does not exceed a maximum value [Col. 3, lines 52-64].

With respect to claim 34, Blakeley teaches a system [Fig. 1] for automatically controlling ramp-up of a superconducting magnet [Fig. 1, 10], comprising means for connecting a power supply to the magnet [Fig. 1, 52, 54, Abstract, lines 3-6]; means for determining constraining parameters of the ramp-up [Col. 3, lines 52-58]; means for applying power to the magnet [Fig. 1, power coming from 52 via cable 56]; means for automatically controlling the ramp-up based on the constraining parameters [Fig. 1, Superconducting magnetic control 16, Col. 3, lines 61-64]; and means for continuing ramp-up until a predetermined value of a target parameter is reached [Col. 4, lines 1-4]. The system encompasses the method.

With respect to claim 35, Blakeley teaches that the system further comprises means for automatically controlling a rate of supply current to the magnet based on the constraining parameters [Col. 3, superconducting magnetic

control circuit 16 controls the supply current to the superconducting magnet 10 based on the superconducting temperature of the magnet 10], and wherein the target parameter comprises magnet frequency or field strength [Col. 4, lines 1-2, magnetic field], and the constraining parameters include magnet current and magnet temperature [Col. 3, lines 52-68].

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 3-8, 12, 16, 36-41, and 45-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Blakeley et al., Patent No. 5,323,776, in view of Redeker et al., Patent No. 6,858,265.

Blakeley does not disclose comparing the operating values with set points of the constraining parameters to control the rate of supply current.

With respect to claim 3, Redeker teaches a method for automatically controlling ramp-up of a superconducting magnet [coil][Col. 9, lines 10-12] comprising the steps of measuring operating values of the constraining parameters [Col. 8, line 64-64, temperature of the coil]; and comparing the operating values with set points of the constraining parameters to control the rate of the supply current [Col. 9, lines 1-12].

Both teachings are analogous superconducting magnets/coils, in which the ramp up/down is controlled automatically. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Redeker, which teaches measuring and comparing the operating values, with Blakeley, in order to maintain the superconducting magnet at superconducting temperatures.

With respect to claim 4, Blakeley teaches measuring magnet temperature, current applied to the magnet, and magnetic field strength continuously during the ramp-up process [Fig. 1, superconducting magnetic control 16 controls the magnetic current and temperature continuously, so the temperature does not exceed the threshold].

With respect to claim 5, Blakeley teaches that constraining parameters comprising magnet current [Col. 3, lines 61-64] during a first phase of the ramp-up and comprise magnet frequency or field strength [Col. 4, lines 1-4] during a second phase of the ramp-up.

With respect to claim 6, Blakely teaches that constraining parameters during the first phase and second phase comprise magnet temperature [Col. 3, lines 52-64, the temperature of the superconducting magnet is continuously measured so it doesn't exceed the threshold temperature].

With respect to claim 7, Redeker teaches that magnet temperature comprises magnet coil temperature [Col. 8, lines 64-65], cryogen temperature, or radiation shield temperature. Blakeley teaches that the magnet temperature is

controlled to remain less than about 7 K, and a total increase in magnet temperature over the ramp-up is controlled to remain less than about 2K [Fig. 1, superconducting magnetic control 16 can be programmed so that the magnet temperature remains less than about 7 K, and a total increase in magnet temperature remains at less than about 2 K]..

With respect to claim 8, Redeker teaches comprising controlling the rate of supply current in the range of 0 to 4 amperes per minute [Col. 9, lines 10-12]. Controlling the temperature by controlling the current is anticipated in col. 9, lines 10-12. Controlling the temperature to an optimum range by controlling the current to an optimum range is well within the level of ordinary skill in the art. Furthermore, it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

With respect to claim 12, Blakeley teaches that the predetermined value of the target parameter is a magnet frequency of about 15.0002 MHz [Fig. 1, superconducting magnetic control 16 can be programmed to set the maximum magnet frequency at 15.0002 megahertz. Furthermore, it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

With respect to claim 16, Blakeley teaches that the maximum value is about 7.2 K [The control circuit 16 can be programmed to set the maximum magnet temperature at 7.2 K]. Furthermore, it has been held that discovering an

optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

With respect to claim 36, Redeker teaches that the system comprises means for automatically controlling ramp-up of a superconducting magnet [coil][Col. 9, lines 10-12] comprising means for measuring operating values of the constraining parameters [Col. 8, line 64-64, temperature of the coil]; and means for comparing the operating values with set points of the constraining parameters to control the rate of the supply current [Col. 9, lines 1-12].

With respect to claim 37, Blakeley teaches means for measuring magnet temperature, current applied to the magnet, and magnetic field strength continuously during the ramp-up process [Fig. 1, superconducting magnetic control 16 controls the magnetic current and temperature continuously, so the temperature does not exceed the threshold].

With respect to claim 38, Blakeley teaches that the constraining parameters comprise magnet current and temperature [Col. 3, lines 61-64] during a first phase of the ramp-up and comprise magnet frequency or field strength and temperature [Col. 4, lines 1-4] during a second phase of the ramp-up.

With respect to claim 39, Blakely teaches that the constraining parameters during the first phase and second phase comprise magnet temperature [Col. 3, lines 52-64, the temperature of the superconducting magnet is continuously measured so it doesn't exceed the threshold temperature].

With respect to claim 40, Redeker teaches that magnet temperature comprises magnet coil temperature [Col. 8, lines 64-65], cryogen temperature, or radiation shield temperature. Blakeley teaches that the magnet temperature is controlled to remain less than about 7 K, and a total increase in magnet temperature over the ramp-up is controlled to remain less than about 2K [Fig. 1, superconducting magnetic control 16 can be programmed so that the magnet temperature remains less than about 7 K, and a total increase in magnet temperature remains at less than about 2 K].

With respect to claim 41, Redeker teaches comprising means for controlling the rate of supply current in the range of 0 to 4 amperes per minute [Col. 9, lines 10-12]. Controlling the temperature by controlling the current is anticipated in col. 9, lines 10-12. Controlling the temperature to an optimum range by controlling the current to an optimum range is well within the level of ordinary skill in the art. Furthermore, it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

With respect to claim 45, Blakeley teaches that the predetermined value of the target parameter is a magnet frequency of about 15.0002 MHz [Fig. 1, superconducting magnetic control 16 can be programmed to set the maximum magnet frequency at 15.0002 megahertz. Furthermore, it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

With respect to claim 46, Blakely teaches a system [Fig. 1] for automatically controlling a ramp-up of a superconducting magnet [Fig. 1, 10], comprising means for applying power to the magnet [Fig. 1, power coming from 52 via cable 56] constrained by a target magnetic field strength of frequency [Col. 4, lines 1-4] and by magnet temperature [Col. 3, lines 52-58] during a second phase of ramp-up. Redeker et al. teaches means for applying power to the magnet constrained by a target current ramp-up rate [Col. 9, lines 10-12] and magnet temperature [Col. 8, lines 64 – Col. 9, lines 6] during a first phase of ramp-up; and means for terminating application of power to the magnet upon reaching a target magnetic field strength or strength [Col. 4, lines 1-4].

With respect to claim 47, Blakeley teaches means for measuring magnet temperature, current applied to the magnet, and magnetic field strength continuously during the ramp-up process [Fig. 1, superconducting magnetic control 16 controls the magnetic current and temperature continuously, so the temperature does not exceed the threshold].

With respect to claim 48, Blakely comprises means for automatically controlling ramp-up such that the magnet temperature does not exceed a maximum value [Col. 3, lines 52-64].

With respect to claim 49, Blakeley teaches that the maximum value is about 7.2 K [The control circuit 16 can be programmed to set the maximum magnet temperature at 7.2 K]. Furthermore, it has been held that discovering an

optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Allowable Subject Matter

5. Claims 9-11, 17-22, 42-44, and 50-55 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is an examiner's statement of reasons for indicating allowance of claim 9: The prior art does not disclose that switching point specifies when constraining parameters change between the first phase and second phase. This feature in combination with the rest of the claim limitations is not anticipated or rendered obvious by the prior art of record.

The following is an examiner's statement of reasons for indicating allowance of claims 17-22 and 50: The prior art does not disclose that a switching parameter defines a transition point between the first phase and second phase. This feature in combination with the rest of the claim limitations is not anticipated or rendered obvious by the prior art of record.

The following is an examiner's statement of reasons for indicating allowance of claim 42: The prior art does not disclose that a switching point specifies when constraining parameters change between the first phase and second phase. This feature in combination with the rest of the claim limitations is not anticipated or rendered obvious by the prior art of record.

6. Claims 23-33 are allowed.

The following is an examiner's statement of reasons for indicating allowance of claims 23 and 28: The prior art does not disclose one or more magnet temperature sensors coupled via an analog-to-digital converter to the auto-ramp controller for measuring magnet temperature; and a magnet field strength or frequency sensor coupled via a meter to the auto-ramp controller for measuring magnet field strength or frequency. This feature in combination with the rest of the claim limitations is not anticipated or rendered obvious by the prior art of record.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dharti H. Patel whose telephone number is 571-272-8659. The examiner can normally be reached on 8:30am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus can be reached on 571-272-2800, Ext. 36. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DHP
12/21/2006

Stephen W Jackson
12-22-06

STEPHEN W. JACKSON
PRIMARY EXAMINER